

STUDIES ON AUSTRALIAN MOLLUSCA. PART XIII.

BY C. HEDLEY, F.L.S.

(Plates xlvi.-li.)

(Continued from Vol. xxvix., p.755.)

ARCA ADAMSIANA Dunker.

Arca adamsiana Dunker, Novit. Conch. 1866, p.88, Pl. xxix., figs.4-6. *Arca signata* Dunker, *op. cit.*, 1868, p.112, Pl. xxxviii., figs.3-5; *Id.*, Lamy, Journ. de Conch., lv., 1907, p.78, Pl. i., figs. 1, 2.

This species has not hitherto been recorded for Australia. I dredged several specimens in ten fathoms in Port Curtis, Queensland. Submitting these to Dr. Lamy, he approved of my identification of them as *A. adamsiana*, and added that they confirmed him in considering that species identical with *A. signata*. For while the larger of my series corresponded well to *A. signata*, the smaller agreed exactly with *A. adamsiana*.

ARCA BOTANICA, sp.nov.

(Pl. li., figs.33, 34, 35.)

Barbatia pusilla Angas, Proc. Zool. Soc., 1867, p.931, not *Byssourca pusilla* Sowerby.

Shell small, very solid, pointed-oblong, inflated, flattened on the anterior-superior face, angled where this face meets the disk, constricted slightly abreast of the byssal gape, truncate posteriorly and attenuate anteriorly. Colour dull white or uniform clay-colour. Umbo at three-fifths of total length, enrolled, closely approaching. Area narrow-lanceolate, sunk under the high arched beaks. Sculpture: small, conical scales set in imbricating flounees, the scales in about forty-four radials, the concentric lines about forty. The radials on the anterior face of

each valve are twelve. The scales are suppressed near the byssus-exit. Teeth eighteen, of which seven are posterior, increasing in size and inclination as they recede from the centre. Length, 15; height, 7; breadth of conjoined valves, 7 mm.

This species is common under stones at low tide-level in the Hormosira-zone, all along the coast of New South Wales. It has hitherto lacked a name through misidentification with a Peruvian species. A member of the subgenus *Acar*, it nearest approaches the tropical *A. plicata* Dillwyn (founded on Chemnitz, Conch. Cab., xi., Pl. 204, fig. 2008). From that, it is distinguishable by finer sculpture, especially by the smaller and more numerous radials of the antero-superior face, by shorter broader form, and by far smaller size. Compared with the Adelaidean *Arca laminata* Angas,* it is smaller, more compact, and delicately sculptured.

ARCA METELLA, sp. nov.

(Plate li., figs. 36, 37.)

Shell small, rather thin, inflated, oblique, medially constricted, especially in the young, and in the left valve. Colour dull white. Anterior margin obliquely truncate, projecting past the hinge-line. Ventral margin insinuate, ascending posteriorly till it meets the hinge-line at a right angle. Umbo at one-third of the total length from the posterior end, low and slightly projecting over the area. Fine, close, radial threads, about seventy in number, are crossed by similar threads about thirty in number, and develop a bead at the point of intersection. Ligamental area narrow-lanceolate, from the umbo a few oblique furrows cross the area anteriorly. The hinge has seven posterior and ten anterior teeth; those remote from the centre are inclined. Length, 10; height, 5.5; depth of single valve, 3 mm.

Numerous separate valves, associated with *Arca strabo*, were dredged by myself in 100 fathoms off Wollongong, and in 80 fathoms off Narrabeen, N. S. Wales.

* *Barbatia laminata* Angas, Proc. Zool. Soc., 1865, p. 655. ?=*Arca irudina* Lamarck, An. s. vert., vi., 1819, p. 41; Lamy, Journ. de Conch., lv., p. 80.

As Dr. Lamy kindly points out to me, this shell has a general resemblance to *Arca nodulosa* Müller, from the North Atlantic. The Australian shell is, however, sharply cancellated, while the radial lines of *A. nodulosa* are broken before reaching the concentric. Our shells are also much smaller and rather more inflated.

CHAMA FIBULA Reeve.

Chama fibula Reeve, Conch. Icon., iv., 1846, Pl. v., fig.27; *Id.*, Melvill & Standen, Journ. Linn. Soc. Zool., xxvii., 1899, p.193. *Chama jukesii* Reeve, Proc. Zool. Soc., 1846 (1847), p.120; *Id.*, Conch. Icon., iv., 1847, Pl. vii., fig.39; *Id.*, Schmeltz, Cat. Mus. Godeff., v., 1874, p.172; *Id.*, Smith, Chall. Rep. Zool., xiii., 1885, p.172. *Chama pellis-phocæ* Reeve, Proc. Zool. Soc., 1846 (1847), p.118; *Id.*, Reeve, Conch. Icon., iv., 1847, Pl. ix., fig.54; *Id.*, Melvill & Standen, *op. cit.*, p.193. *C. bellisphocæ* Clessin, Conch. Cab., 1889, p.37, Pl.17, fig.1. *Chama spinosa* Angas, Proc. Zool. Soc., 1867, p.925 (not Broderip). *Chama reflexa* Angas, Proc. Zool. Soc., 1871, p.100 (not Reeve).

A small *Chama* is not uncommon on stones between tide-marks in the sheltered parts of Sydney Harbour. It is firmly attached by the greater part of the left valve, the opercular valve usually pitched at a high inclination to the base; it is orbicular, with a sculpture of small, crowded, erect, subtubular scales, and attains a diameter of 45 mm. I have dredged this species also in Port Curtis and off Cape York, Queensland. No other species of this genus comes as far south as Sydney.

The first mention of *Chama* from this State is Lamarck's note that the variety (b) of *C. ruderalis* comes from Port Jackson. Both Delessert and Chenu* illustrate *C. ruderalis* as attached by the apex of the right valve. In size and general appearance, it is conformable to the Sydney shell. In South and West Australia, there is a species which is usually sinistral, and exceptionally dextral, and may, therefore, be Lamarck's species. If Chenu's figs.2b, 2c represent Lamarck's var. (b), then the locality ascribed to it is erroneous.

* Delessert, Recueil, 1841, Pl. xiii., figs.5, a, b. Chenu, Illustr. Conch., 1846, Pl.5, figs.2, 2a, 2b, 2c.

The next records of *Chama* were by Angas, who, in his catalogue of Port Jackson shells, included *C. spinosa* Broderip, in 1867, and *C. reflexa* Reeve, in 1871. *C. spinosa* was described from Lord Hood's Island, or Marutea, in the Paumotus, and its appearance here is improbable. It seems to be based on a shell too young to display specific characters. *C. reflexa* is from Darnley Island or Erub, Torres Strait. The figure of it does not well agree with the Sydney shell. From Cape York, Smith identified *C. jukesii* as taken by the "Challenger," and unites to these, as synonyms, *C. fibula* Reeve, and *C. pellis-phocæ* Reeve. The two latter are again recorded from this area by Melvill & Standen.

Of these three, *C. fibula* was published in December, 1846, and must, therefore, take precedence over *C. jukesii* and *C. pellis-phocæ*. "Preliminary" descriptions of the two latter were issued 27th January, 1847, in the Proceedings of the Zoological Society, but perhaps subsequent to their appearance in the Iconica in January, 1847.

In the case of another Queensland species, *Chama pulchella*, Reeve seems to have intruded not only on the prior *C. lobata* Broderip, and the Lamarekian *C. damæcornis*, but on the original Linnean *Chama lazarus*.

There is yet another species described by Reeve as *C. nivalis*, which Jukes procured in Queensland, and which seems to me likely to be preoccupied by Lamarek's *Chama limbula*.*

Such items as these support Cooke's contention that, in *Chama*, "Reeve has made fifty-five species out of material probably better represented by ten."†

LUCINIDA HILAIRA, sp.nov.

(Plate li., figs.38, 39.)

Shell rather thin, inflated, truncate-circular. Colour dull white. The lunule-side is straight, cutting off a segment from the circle which the margin of the valve otherwise describes.

* Lamarek, An. s. vert., vi., 1819, p.95; Chenu, Illustr. Conch., 1846, Pl.7, figs.5, 5a. 5b.

† Cooke, Ann. Mag. Nat. Hist., (5), xviii., 1886, p.96.

Umbo small, incurved. Lunule rather broad, margined by a shallow groove, beyond which is a low broad fold. Sculpture: irregular, weak, concentric growth-lines, across which runs a series of delicate and superficial radial scratches. Edge of valve smooth and thin. Height, 18; length, 19; depth of single valve, 6 mm.

Hab.—Off Montagu Island, 7-10 fathoms, February, 1916, (type), self. Also separate valves from the ocean-beaches round Sydney.

In general appearance, *L. hilaira* is like *Lucina perobliqua* Tate, but that is larger, more solid, more inflated, with more regular, concentric sculpture.

SOLECARDIA CRYPTOZOICA, n.sp.

(Plate xlvii., fig.1; Pl. li., fig.40.)

Scintilla anomala Angas, Proc. Zool. Soc., 1867 (1868), p.928; not *S. anomala* Deshayes, Proc. Zool. Soc., 1855 (1856), p.181; nor *S. anomala* Deshayes, Explan. Pl. xlix., figs.13-15, Anim. s. vert. Bassin de Paris, i., 1860.

Shell thin, translucent, of a milky colour, subequilateral, oblong in outline when young but becoming ovate when aged. When in contact ventrally, the valves are slightly apart dorsally. Ventral margins slightly curved, anterior end rounded, posterior produced. In the centre, the valve is tumid, but, dorsally, the margins are compressed and elevated in an arched crest on either side of the umbo, which projects prominently. Surface glossy, under the lens a few faint concentric threads appear, and the dorsal margins are slightly vermiculate. Length, 11; height, 8 mm.

The animal is of a milky translucency, in pale examples tipped with lemon, in darker specimens the mantle-margin and the longer tentacles are orange, sometimes the most prominent tentacles are tipped with scarlet. The foot is long and narrow, and is thrust far out, thus enabling the animal to progress rapidly. A thin transparent membrane, an outgrowth of the mantle, is spread over most, if not all, of the shell. On it are numerous papillæ which, round the margin, develop into tentacles. At each

dorsal angle is a particularly long, slender horn. Similar processes on the mantle are shown in a sketch of *Scintilla chilkaensis* Preston.* Posteriorly, the mantle develops into two voluminous flaps. This gregarious species shelters under stones at low water in the mud-zone in Middle Harbour, Sydney, in companies of a dozen or so.

Following the identification of G. F. Angas, this species has locally been received as *Scintilla anomala*. But it does not agree with the figure of that species in the Thesaurus; and Mr. H. B. Preston, who compared the type in the British Museum with Sydney specimens, assures me that they are distinct.

CARDIUM RACKETII DONOVAN.

Cardium racketii Donovan, Naturalist's Repository, iv., 1826, Pl.124. *Cardium radiatum* Reeve, and *Cardium pallidum* Reeve, Conch. Icon., ii., 1845, Pl. xviii., figs.89, 92. *Cardium tenuicostatum* of authors, but not of Lamarck and Delessert.

No mention is made of *Cardium racketii* in any of the monographs or catalogues dealing with the genus *Cardium*. Yet it was excellently figured, described, and localised, as being the size of the ordinary European *Cardium echinatum*, having 47 ribs, and obtained by Humphrey in New South Wales. It is obviously a species common round Sydney, a particularly fine example of which before me, from the Harbour, is 48 mm. in height and in breadth, and has 49 ribs. By Forbes, it was reported from Sydney as *C. radiatum*, and, by both Angas and Smith, as *C. tenuicostatum*.†

But *Cardium tenuicostatum* was described by Lamarck from Timor and New Holland as a shell 56 mm. in diameter, with 48 ribs. The figure which Delessert gave (Pl. xi., fig.6) from a Lamarckian specimen exhibits a shell of a quite different contour from *C. racketii*, and disagrees with the figures which Sowerby, Hanley, Reeve, and Roemer have produced as of *C. tenuicostatum*. It is now suggested that the real *C. tenuicostatum* has been lost

* Annandale and Kemp, Mem. Indian Museum. v., 1910, p.351.

† Forbes, Voy. Rattlesnake, ii., 1852, p.366. Angas, Proc. Zool. Soc., 1867, p.925. Smith, Chall. Rep. Zool., xii., 1885, p.159.

to view, and that the later Australian references to it should be transferred to *C. racketsii* Donovan.

CARDIUM CYGNORUM Deshayes.

(Plate lii., fig.41.)

Cardium cygnorum Deshayes, Proc. Zool. Soc., 1854 (May, 1855), p.331; *Id.*, Angas, *op. cit.*, 1865, p.651; *Id.*, Tryon, Am. Journ. Conch., vii., 1872, Suppl., p.261; *Id.*, Tenison-Woods, Proc. Roy. Soc. Tasm., 1877, p.53; *Id.*, Tate, Trans. Roy. Soc. S.A., ix., 1887, p.95; *Id.*, Tate & May, Proc. Linn. Soc. N. S. Wales, xxvi., 1901, p.430; *Id.*, Pritchard & Gatliff, Proc. Roy. Soc. Vict., xvi., 1903, p.135.

Though this species has been frequently cited in literature, it has not yet been figured. A specimen 50 mm. high and 42 mm. long, from St. Vincent's Gulf, S. Australia, identified by Mr. E. A. Smith, is, therefore, here illustrated. The range of this species is now announced to extend into New South Wales. I have dredged a living specimen, 26 x 28 mm., in 7-10 fathoms, on sandy ground, under Montagu Island.

TRIDACNA GIGANTEA Perry.

Chama gigas Linné (in part only) Syst. Nat., x., 1758, p.691 (*vide* Hanley, Ips. Linn. Conch., 1855, p.85); *Id.*, Born, Test. Mus. Cæs., 1780, p.80; *Id.*, Chemnitz, Conch. Cab., vii., 1784, p.111, Pl.49, figs.492-4. "*La Faitière*," Cubières, Histoire Abrégé des Coquillages de Mer, 1798, p.148. *Chama gigantea* Perry, Conchology, 1811, p.2. *Chama gigas* Flinders, Voy. Terr. Austr., ii., 1814, p.114. *Tridacna gigas* Lamarck, An. s. vert., vi., 1819, p.105; *Id.*, Ten.-Woods, these Proceedings, v., 1880, p.125; *Id.*, Kobelt, Nachr. deut. Malak. Gesell., xv., 1883, p.189; *Id.*, Kent, Great Barrier Reef, 1893, p.44, Pl. xxix.; *Id.*, Smith, Proc. Malac. Soc. iii., 1898, p.112; *Id.*, Hedley, Nautilus, xv., 1902, p.98; *Id.*, Banfield, "Confessions of a Beachcomber," 1908, p.138. *Tridacna lamarcki* Hidalgo, Mem. Real Acad. Cienc. Madrid, xxi., 1903, p.385.

Under the name of *Chama gigas*, the Father of Natural History seems to have embraced the whole of the modern genus

Tridacna. For the name *gigas*, as restricted to a single species, the candidates are the shell subsequently named *squamosa* by Lamarck, and a huge species whose valves, in the Ulrica Museum, together weighed 498 lbs.

After careful examination, Hanley decided that the furbeled clam, such as Reeve has figured (Conch. Icon., xiv., 1862, *Tridacna*, Pl. iii.) for *T. squamosa*, ought rightly to bear the name of *gigas*. He based his verdict on the ground that the actual shell owned by Linné as representing *gigas*, is the Lamarckian *squamosa*, and that to this apply most of the literary references. Linnean contemporaries, such as Born, Regenfuss, and Chemnitz, while making casual reference to the giant, all agree in figuring and describing *squamosa* as the Linnean *gigas*.

Discriminating in 1819 between the species his predecessors had confused, Lamarck unlawfully used the name *gigas* for the largest form, while for the Linnean *gigas* he proposed *squamosa*. Attentive to the remarks of Hanley, Hidalgo, in 1903, renamed the biggest species *T. lamarcki*. But in 1811, Perry had already used the name *Chama gigantea* for "The largest shell at present known a Bivalve about three feet in length, one foot and a half in breadth, the shell itself being four or five inches thick."

As the young of the giant has not yet been traced to the adult, it is still possible that *squamosa* is a juvenile deeper-water form of the large intertidal and abraded *gigantea*.

The size to which this species ultimately attains is, as Kent and Banfield remark, a favourite subject for romance among travellers. After some inquiries, Smith concluded that the largest authentic record was that by Dillwyn of a Sumatran pair which weighed 507 lbs., and of which the largest valve was four feet six inches long, two feet five and a half inches high, and one foot deep. The heaviest known are a pair weighing 550 lbs., which, Cubières and Lamarck relate, were presented by the Venetian Republic to Francis I. These still exist, their edges bound with brass, as holy-water basins in the cathedral of St. Sulpice, in Paris.

The photographs of Saville Kent show the giant clams in their natural position on the Great Barrier Reef, where they occur

free and exposed at low tide, standing on their umbones, and showing their brightly coloured mantle and so-called eyes* as they gape. They were reported by Capt. Cook as "cockles of so enormous a size that one of them was more than two men could eat."†

Kobelt has noticed that Javan specimens were infested by *Pinnotheres*, a commensal crustacean.

Flinders described how the valves of this giant cockle were used as tanks on Half-way Island or Parima, a waterless cay in Torres Strait. To each shell, the rain-water was led from Pandanus trees by gutters, long slips of bark, so that a shower would pour two or three pints into each for the use of native canoe-voyagers.

DOSINIA CROCEA Deshayes.

Dosinia crocea Deshayes, Brit. Mus. Cat., 1853, p.8; *Id.*, Roemer, Monogr., 1862, p.71, Pl. xiii., fig.4; *Id.*, Tate, Trans. Roy. Soc. S.A., ix., 1887, p.94; *Id.*, Pritchard & Gatliff, Proc. Roy. Soc. Vict., xvi., 1903, p.133; *Id.*, May, Proc. Roy. Soc. Tasm., 1915, p.80.

This species is now added to the fauna of New South Wales on the strength of specimens I dredged in 7-10 fathoms under Montagu Island.

GAFRARIUM QUOYI Hanley.

Cytherea scripta var. *quoyi* Hanley, Recent Shells, 1844, p.11 bis, Pl. xv., fig.25. *Circe quoyi* Sowerby, Thes. Conch., ii., 1853, p.758. *Circe lenticularis* Deshayes, Cat. Conchif. Brit. Mus., June, 1853, p.85; *Id.*, Proc. Zool. Soc., 1853 (June 27, 1854), p.7; *Id.*, Reeve, Conch. Icon., xiv., 1863, Pl. ii., fig.7; *Id.*, Roemer, Monog. Venus, 1869, p.200, Pl. lv., fig.1; *Id.*, von Martens, Zool. Forsch. Semon, 1894, p.94. *Circe trigona* Reeve, Conch. Icon., xiv., 1863, Pl. iii., fig.12. *Circe rivularis* Sowerby, Thes. Conch., ii., 1853, p.652, Pl.139, figs.46-48; *Id.*, Hanley,

* Brock, Ann. Mag. Nat. Hist. (6), i., 1888, p.435.

† Cook's First Voyage, iii., 1783, p.566.

Recent Shells, 1856, p.355; *Id.*, Reeve, Conch. Icon., xiv., 1864, Pl. i., fig.3 (not *Venus rivularis* Born, Index Mus. Cæs. Vind., 1778, p.59, and Test. ect., 1780, p.72, Pl. v., fig.7). *Circe undatina* Angas, Proc. Zool. Soc., 1867, p.922 (? *Venus undatina* Lamarek, An. s. vert., v., 1818, p.575; ? Reeve, Conch. Icon., xiv., 1864, Pl. i., fig.1c). *Circe personata* Reeve, Conch. Icon., xiv., 1864, Pl.2, fig.6; *Id.*, Roemer, Monog. Venus, 1869, Pl. liv., figs.1a, 1b, not 1c; *Id.*, Schmeltz, Cat. Godeff. Mus., v., 1875, p.169 (not *C. personata* Desh., Cat. Conch. Brit. Mus., 1853, p.84). *Circe sugillata* Reeve, Conch. Icon., xiv., 1864, Pl. iii., fig.11. *Circe scripta* Chenu, Illustr. Conch., 1847, Pl. xi., figs.8, 8a, 8b only; *Id.*, Smith, Chall. Exped. Zool., xiii., 1885, p.140; *Id.*, Roth, N. Qld. Ethn. Bull., iii., 1901, p.18; *Id.*, Hedley, these Proceedings, xxxi., 1906, p.466 (not *Venus scripta* Linné, Syst. Nat., x., 1758, p.680).

The "Challenger" Expedition reported *Circe scripta* Linn., as taken in 4-18 fathoms in Port Jackson. It is difficult to decide what shell ought to bear this name. For none of the figures cited by Linné in the original account of 1758 harmonise with any shell known in modern times as *Circe scripta*. He quoted first the *Chama litterata rotunda* of Rumphius,* which is a rounder, smoother shell than a *Circe*, and might pass as well for *Lioconcha fastigiata*. Hanley stated† that a specimen in the Linnean cabinet corresponds to Sowerby's illustration of *C. scripta*, Thes. Conch., ii., 1844, Pl.139, fig.38. This form(= *albida* Deshayes) occurs, I believe, in Queensland; it differs from the Sydney shell in shape and colour.

Thus, whether *C. scripta* is to be identified from the figures to which Linné referred, or whether the shell owned by Linné, and noted by Hanley, is to be taken for the foundation of the species, we must equally exclude *C. scripta* from the local fauna. Having arrived at the conclusion that "this shell (usually termed the Scripta of Australia) is completely distinct from the true scripta of Linnæus," Hanley suggested for it "the name of Quoyi, in

* Rumphius, Amboin. Rariteitkamer, 1741, p.139.

† Hanley, Ips. Linn. Conch., 1855, p.78.



honour of the naturalist who has so successfully investigated the invertebrata of that portion of the globe." But he again described this species on p.355 under the name of *Cytherea rivularis* Born. The Sydney shell, which has a smooth ventral margin, and so belongs to the section *Circe*, as restricted by Jukes Browne,* appears to have been figured by Sowerby and Reeve as *Circe rivularis* Born. But Brauer† has determined Born's type of *rivularis* to be *Circe crocea* Gray, as figured by Roemer, Pl. lvi., fig 2c. This is different from *C. quoyi*, being more inflated, with coarser, umbonal, oblique folds.

Schmeltz has identified the Sydney shell as *C. personata* Deshayes, 1853, but that was founded on a Nicobar species figured by Chemnitz (Vol. vii., figs.420-426), and was already named *Circe violacea* by Schumacher in 1817. This, and not *scripta* Linn., was the type of the genus *Circe*. Perhaps the figures of *personata* supplied by later authors were derived from Australian shells. Angas referred the Sydney shell to *Cytherea undatina* Lamk. This may be correct, and, if so, would take precedence over *quoyi* or other names. But the literary history of this is too meagre and contradictory for adoption. For Roemer's figure of it agrees neither with Lamarck's description of the colour-pattern, nor with Deshayes' determination of it as *scripta*. Possibly Lamarck's species might be the neglected *Venus Wauaria* Gmelin, 1791.

Adams has figured‡ *C. quoyi* as the host of *Myochama stutchburyi*.

As the best expression of typical New South Wales *G. quoyi*, Roemer's fig.1, Plate liv., may be selected. A variety from N. W. Australia is shown by Reeve's Pl. i., fig.3a. A well marked related form is *C. trigona* Reeve, 1863, not yet reported as Australian, but here noted as from Stradbroke and Facing Islands, Queensland. It is shown by Roemer's Pl.53, fig.2, as *Circe plicatina*.

* Jukes Browne, Proc. Mal. Soc., xi., 1914, p.66.

† Brauer, S. B. Akad. Wien, lxxvii., 1878, p.132.

‡ Adams, Proc. Zool. Soc., 1852, Pl. xv., fig.4.

MARCIA NITIDA Quoy & Gaimard.

(Plate xlvi., figs.2, 3)

Chione nitida Hedley, these Proceedings, xxix., 1904, p.194.

This species attains a larger size than is usually recognised. One specimen I gathered is 56 mm. long, and 37 high, the conjoined valves being 27 mm. deep. It occurs alive at low tide in sand on the margin of a *Zostera*-flat by the Middle Harbour Sand-Spit. The animal has a long, tongue-shaped, orange-coloured foot. The siphons are buff streaked and spotted with black; they are of equal length and deeply divided, their apertures fringed with digitate papillæ. The exhalant has, besides, a lobe which acts as a lid. The mantle-margin is finely fringed with papillæ. In his review of the family, this species was, under the synonym of *fumigata*, included in *Marcia* by Jukes Browne.*

TELLINA ASTULA, sp.nov.

(Plate lii., figs.42, 43.)

Tellina nitida Perry, Conchology, 1811, Pl. lv., fig.1. Not *Tellina nitida* Poli, 1791. *Tellina perna* Brazier, (not Spengler), these Proceedings, ii., 1877 (1878), p.142; *Id.*, Whitelegge, Proc. Roy. Soc., N. S. Wales, xxiii., 1889, p.238.

Shell oblong acuminate, polished, convex, rose-pink, with broad radiating bands of cream, smooth except on the rostrum. Dorsal margin straight, anterior end semicircular, ventral margin arcuate. Rostrum tongue-shaped, concave above, protuberant posteriorly, end truncate, lower margin straight, horizontal, sharply bent to continue the ventral margin. The valves differ by the rostrum being bent to the right and having, in the right valve, a fold at its base, absent in the left. From the umbo to the extremity runs a shallow furrow. Spaced and sharply engraved concentric grooves extend in the right valve over the whole rostral area past the fold and notch, but, on the left, only from the radial furrow to the edge. The anterior side is rather longer than the posterior. Length, 155; height, 25; depth, 11 mm.

Hab.—Sow and Pigs Reef, Sydney (Brazier), Broken Bay (Hargraves), and Trial Bay (C. Laseron), N.S.W.

* J. Browne, Proc. Malac. Soc., viii., 1909, p.233; and xi., 1914, p.87.

This has a general likeness to *T. perna*, for which it has been mistaken, but *T. astula* has a much narrower rostrum, and an abrupt notch where the rostrum leaves the body. *T. pharaonis* has the rostrum grooved, but both the rostrum and the rest of the valve are longer and narrower than in *T. astula*. *T. consanguinea* Sowerby,* is more compressed, and the rostrum has a more upward direction.

SPISULA TRIGONELLA Lamarck.

Maetra trigonella Lamarck, An. s. vert., v., 1818, p.479; *Id.*, Lamy, Bull. Mus. Hist. Nat., 1914, p.245. *Gnathodon parvum* Petit, Journ. de Conch., iv., 1853, p.358, Pl. xiii., figs. 9, 10. *Spisula parva* Dall, Proc. U. S. Nat. Mus., xvii., 1894, p.106; *Id.*, Hedley, Proc. Linn. Soc. N. S. Wales, xxvi., 1902, p.707, Pl. xxxiv., figs.2, 3 (hinge); *Id.*, Smith, Proc. Malac. Soc., xi., 1914, p.146.

Maetra trigonella was gathered by Péron at Shark's Bay, W.A., and was named by Lamarck. For nearly a century, his unfigured type has lain unobserved in the Paris Museum. Dr. Lamy has lately disinterred it, and declares it identical with *Spisula parva*, which younger name must now be superseded.

AMPHIDESMA ANGUSTA Reeve.

(Plate xlv., fig.4.)

Mesodesma angusta Reeve, Conch. Icon., viii., July 1854, Pl. i., fig.3; *Id.*, Deshayes, Proc. Zool. Soc., 1854 (May, 1855), p.338; *Id.*, Tate, Trans. Roy. Soc. S.A., xxi., 1897, p.46; *Id.*, Lamy, Journ. de Conch., lxii., 1914, pp.37, 38, fig.2. *Mesodesma elongata* Reeve, Conch. Icon., viii., 1854, Pl. i., fig.5; *Id.*, Deshayes, Proc. Zool. Soc., 1854 (1855), p.337; *Id.*, Tate, Trans. Roy. Soc. S.A., ix., 1887, p.85; *Id.*, Tate & May, these Proceedings, xxvi., 1901, p.424; *Id.*, Pritchard & Gatliff, Proc. Roy. Soc. Vict., xvi., 1903, p.110. *Donacilla elongata* Angas, Proc. Zool. Soc., 1865, p.647, and 1867, p.220; *Id.*, Tryon, Am. Journ. Conch., iv., Suppl., 1868, p.126; *Id.*, Ten-Woods, Proc. Roy. Soc. Tasm., 1877, p.50.

* Sowerby, Ann. Mag. Nat. Hist., (7), xii., 1903, p.500.

It has already been reported by Prof. Tate that *M. angusta* and *M. elongata* are synonyms, an observation which, from examination of their respective types, I can confirm. As the notices in the *Conchologica Iconica* were published a year before those in the *Zoological Proceedings*, it follows that *angusta* must be credited to Reeve, and must also take precedence over *elongata*. To the list of Tasmanian species wrongly credited to Raine Island (*antea*, xxxviii., p.268), *A. elongata* can now be added.

This species is common round Sydney. Its habit is to lie in the sand in the wash of the sea. When the drag of the waves uncovers it, there is a sparkle of yellow, a scramble, two or three quick stabs of the foot, and the bivalve is again buried. The foot protrudes to a length equal to that of the shell; it is flat, cordate-acuminate, buff with a pink tinge. The exhalant siphon seems to be always exerted further than its fellow; the orifice is beset with a few, small, digitate papillæ. The inhalant siphon issues at the angle of the shell; as far as I could observe it in captivity, it extends only a third of the length of the other siphon, and has the expanded orifice fringed with fine, pinnatifid processes.

Mr. T. Dick sends me a specimen of *A. angusta* from Port Macquarie, which he found in process of being bored by *Polinices incei*.

AMPHIDESMA CUNEATA Lamarck.

Crassatella cuneata Lamarck, An. s. vert., v., 1818, p.483; *Id.*, Lamy, Bull. Mus. Hist. Nat., 1912, p.248, text-fig. (not of Sowerby, Reeve, Hanley, or Tate). *Amphidesma glabrella* Lamarck, *op. cit.*, p.493; *Id.*, Lamy, *op. cit.*, p.253; *Id.*, Lamy, Journ. de Conch., lxi., 1913, p.322; *Id.*, Blainville, Man. de Malac., 1827, Pl.78, fig.6; *Id.*, Tate, Trans. Roy. Soc. S.A., xxi., 1897, p.46. *Mesodesma gaymardi* Deshayes, Encycl. Méth., vers. ii., 1835, p.444 (*vide* Lamy). *Mesodesma precisa* Reeve, Conch. Icon., vii., 1854, Pl.4, fig.31; *Id.*, Deshayes, Proc. Zool. Soc., 1854 (May, 1855), p.338. *Mesodesma obtusa* Crosse & Fischer, Journ. de Conch., xii., 1864, p.350, and xiii., 1865, p.428, Pl. xi., fig.4; *Id.*, Angas, Proc. Zool. Soc., 1867, p.920.

This is another case in which Australian conchologists have benefited by the examination of Lamarck's types by Dr. Ed. Lamy, of Paris. This southern species is dwarfed, and scarce in this latitude, which makes it improbable that Melvill & Standen were correct in identifying *M. precisa* from Albany Pass. The first record of this from our State was a note by Angas that he had found *Donacilla obtusa* at The Spit, Middle Harbour. Tate ascertained that this name was a synonym of *M. precisa* and *M. glabrella*. The unfigured *C. cuneata* had been generally ascribed, as in Reeve's Iconica, to *Anapella cycladea* (= *Spisula adalaidæ* Angas), but the figure of the type, lately published by Dr. Lamy, has corrected this error. This species varies a good deal in outline.

LINGULA ROSTRUM Shaw.

Mytilus rostrum Shaw, Nat. Miscell., ix., 1797, Pl.315, two upper figures. *Pharetra monoculoides* Boltén, Mus. Bolt., (2), 1798, p.159, for Chemn. Conch. Cab., x., 1788, p 360, Pl.172, figs.1675-77. *Lingula unguis* Cuvier, Tab. Elem., 1798, p.435.

Lingula anatina Lamarck, Syst. An. s. vert., 1801, p.141, for *Lingula* sp. Bruguière, Encycl. Méth. vers, 1797, Pl.250, fig.1,a, b, c; *Id.*, Davidson, Trans. Linn. Soc. Zool, iv., 1888, p.206, Pl. xxix., figs.1-8; *Id.*, von Martens, Forsch. Gazelle, iii., 1889, p.263. *Lingula hians* Angas, Proc. Zool. Soc., 1867, p.935; *Id.*, Whitelegge, Proc Roy. Soc. N. S. Wales, xxiii., 1889, p.294.

The type of the brachiopod genus *Lingula* is usually known by Lamarck's name of *anatina*. There are, however, other names whose claims deserve consideration. Linné included, under "*Patella unguis*," references both to a *Scutus* and to a *Lingula*. According to Hanley,* it is the former, based on a figure of Rumphius, which should carry the Linnean name.

From the Museum Gerversianum, there is cited by Dillwyn for this species *Anatifera luzona* of Meuschen.

A Philippine form was well figured and legitimately named *Mytilus rostrum* by Shaw in 1797, a name which, though left for

* Hanley, Ips. Linn. Conch., 1854, p.425.

a century in obscurity, appears the rightful heir to the title. In the following year, Bolten proposed a binomial for some excellent figures published polynomially by Chemnitz. The generally accepted name by Lamarck was not advanced till 1801.

The genus-name *Lingula* appeared rather irregularly as a heading for a single species on a plate in the Encyclopédie Méthodique. If this is ruled out, then we shall have to fall back on Bolten's *Pharetra*.

The species have been discriminated usually from dry and probably distorted material. Little attention has been given to change in appearance in different stages of growth. It may be, therefore, still a matter for investigation whether the names assigned to Australian forms, *L. tumidula* Reeve, *L. murphiana* Reeve, *L. exusta* Reeve, and *L. hirundo* Reeve, represent distinct species, geographical races, or growth-forms of a single species.

L. anatina was recognised from Moreton Bay by Dr. E. von Martens. Some fifty years ago, Angas gathered, in Middle Harbour, a species of *Lingula* which he determined as *L. hians*. Brazier has noted, in Whitelegge's List, additional localities for this.

A REVISION OF AUSTRALASIAN TUGALIA.

Of *Tugalia*, there are two species in New Zealand, and two others in Australia. Confusion has enveloped this small group; for under the name of *T. parmophoidea*, or its various renderings, each of the other species has in turn been included. The identity of the genotype has thus been obscured. Monographs in the Thesaurus and Conchologica Iconica, by transfer of names to wrong genera, species, and localities, by omission, and disunion, constructed a labyrinth of error which has entangled conchologists for half a century. Thus, in 1867, *Emarginula ossea* Gould, from Fiji, was substituted for the totally different *T. parmophoidea* from Sydney by Angas. In 1883, Brazier re-distributed the names of three species incorrectly. As late as 1903, Pritchard & Gatliff reflected current opinion by presenting, under the head of *T. parmophoidea*, a tangled, heterogeneous mass of *intermedia*, *elegans*, *tusmanica*, and *australis*.

It is hoped that the figures of the four species concerned, now placed side by side for comparison, will relieve the misunderstanding that has hitherto prevailed.

TUGALIA INTERMEDIA Reeve.

(Plate lii., fig.44.)

Parmophorus intermedius Reeve, Conch. Syst., ii. 1842, p.22, Pl. cxxxix., figs.5, 6; *Id.*, Reeve, Proc. Zool. Soc., 1842, p.50; *Id.*, Hutton, Proc. Linn. Soc. N. S. Wales, ix., 1884, p.371. *Submarginula intermedia* Suter, Man. N.Z. Moll., 1913, p.102, Pl.8, fig.6. *Tugalia cinerea* Sowerby, Thes. Conch., iii., 1863, p.221, Pl.249, fig.15. *Tugalia parmophoridea* Sowerby, Thes. Conch., iii., 1863, p.221, Pl.249, fig.16; *Id.*, Sowerby, Conch. Icon., xvii., 1870, Pl.i., fig.4a, not 4b; *Id.*, Hutton, Man. N.Z. Moll., 1880, p.106. *Submarginula parmophoidea* Harris, Cat. Tert. Moll. Brit. Mus., i., 1897, p.290. *Tugali elegans* Gray, in Dieffenbach, Travels in N.Z., ii., 1843, p.240; *Id.*, Revue Zool., 1844, p.355; *Id.*, von Martens, Crit. List N.Z. Mollusca, 1873, p.35. Not *Parmophorus elegans* Gray, Annals of Philos., ix., 1825, p.140 (= *Scutus unguis* Linn.).

Hitherto, this species has not been clearly differentiated from *T. parmophoidea*. The New Zealand form is readily distinguishable by having the apex considerably nearer to the margin than has the Australian shell. In *T. intermedia*, the sculpture is finer, the shell is not so tall, and has a more marked sinus at the anterior margin. Otherwise the two are much alike in size, shape, and general appearance. The pair represent one another on each side of the Tasman Sea, which neither crosses.

In *T. elegans*, the concentric sculpture is described as forming arched ribs across the radial striae, a point which, supported by an exact locality, Great Barrier Island, fixes the identity of the species. On the Barrier Island shell, Gray founded a new genus, which he spelt *Tugali*, apparently a misprint later corrected by himself to *Tugalia*.*

* Gray, Guide to the Systematic Distribution of Mollusca in the British Museum, Part i., 1857, p.163.

By A. Adams,* *T. elegans* was wrongly referred to North Africa, and subsequent authors have mostly lost sight of the name.

The specimen figured is 29 mm. long, and was collected by Mr. H. Hill, at Wellington, New Zealand.

TUGALIA PARMOPHOIDEA Quoy & Gaimard.

(Plate lii., fig.45.)

Emarginula parmophoidea Q. & G., Zool. Astrolabe, iii., 1835, p.325, Pl.68, figs.15, 16. *Clypidina parmophoroidea* Chenu, Man. Conch., i., 1859, p.373, figs.2798-99. *Tugalia parmophoroidea* Sowerby, Conch. Icon., xvii., 1871, Pl. i., fig.4b, not 4a. *Emarginula parmophoidea* Watson, Chall. Rep. Zool., xv., 1886, p.35. *Tugalia parmophoidea* (in part) Pritchard & Gatliff, Proc. Roy. Soc. Vict., xv., 1903, p.190. *Subemarginula parmophoroidea* Shirley, Proc. Roy. Soc. Q'land, xxiii., 1911, p.96. *Tugalia ossea* Sowerby, Thes. Conch., iii., 1863, p.221, Pl.249, fig.18; *Id.*, Angas, Proc. Zool. Soc., 1867, p.219. *Tugalia australis* Ten-Woods, Proc. Roy. Soc. Tasm., 1876 (1877), p.44; *Id.*, Hardy, Proc. Roy. Soc. Tasm., 1915, p.63. *Tugalia intermedia* Brazier, Proc. Linn. Soc. N. S. Wales, viii., 1883, p.227.

This shell was, by Quoy & Gaimard, reported from New Holland. Their account suits a species from New South Wales, with which their name has been generally associated. But the name has also been applied to other members of the genus.

Angas misidentified the Sydney *Tugalia* as *T. ossea* Gould, a species of another genus. Detecting this error, and probably associating *T. parmophoidea* with the New Zealand form, Tenison-Woods proceeded to rename the Sydney shell as *T. australis*.

T. parmophoidea inhabits the coast of South Queensland and New South Wales, but fails, so Mr. W. L. May tells me, to reach Tasmania. A statement by Angas, that it occurs in South Australia, seems to need confirmation. The specimen figured is 27 mm. long, and was collected by myself at Cape Byron, N. S. Wales.

* A. Adams, Ann. Mag. Nat. Hist. (3), vi., 1860, p.112.

TUGALIA CICATRICOSA A. Adams.

(Plate lii., fig.46.)

Tugali cicatricosa A. Adams, Proc. Zool. Soc., 1851(1852)p.89; *Id.*, Angas, *op. cit.*, 1865, p.185. *Tugalia cicatrosa* Sowerby, Thes. Conch., iii., 1863, p.222, Pl.249, fig.14; *Id.*, Conch. Icon., xvii., 1870, Pl i., fig.7. *Tugalia tasmanica* Ten.-Woods, Proc. Roy. Soc. Tasm., 1876 (1877), p.156.

Like *T. intermedia*, this species was first erroneously ascribed to the Philippine Islands. Angas recognised it from Port Lincoln. I have seen it from Ulverstone, Tasmania; Neptune Islands, South Australia; and Geographe Bay, West Australia. This distribution suggests that it will prove to be the Adelaidean representative of the Peronian *T. parmophoidea*. Compared with that, *T. cicatricosa* is more depressed, with the sides more parallel; the apex nearer to the margin, is more notched anteriorly, and has a much coarser sculpture. A scar on the summit, which suggested the name, was an individual and accidental feature of the type-shell. It is by chance repeated in a specimen before me, and was probably caused by adherence of a *Capulus* or some such associate. The specimen figured is 18 mm. long, and was collected in North Tasmania, by Miss M. Lodder.

TUGALIA BASCAUDA, sp.nov.

(Plate lii., fig.47.)

Shell small, solid, oblong. Colour milk-white. Surface glossy. Sculpture : about 50 radial cords are crossed by 25 similar concentric cords, beaded at the points of intersection, and enclosing deep, square pits as meshes. From the apex, a radial of double breadth and height runs anteriorly along the median line. The edge of the aperture is crenulated by the radials. Length, 12 breadth, 8; height, 3 mm.

The specimen drawn (type) was collected by the late Mr, R. Helms, under stones, near Wellington, New Zealand. I have also seen specimens from the Chatham Islands, labelled *Tugalia elegans* by Capt. F. W. Hutton. It is apparently the species cited by Mr. Suter in the Manual of New Zealand Mollusca as

Submarginula parmophoidea, now shown to be a different Australian species.

HEMITOMA ASPERA Gould.

(Plate xlv., fig.6.)

In the last Part of these Studies (*antea*, xxxix, p.707), it was stated that, though in ordinary use, *Submarginula* was untenable. Relying on a defective entry in Scudder, *Montfortia* was selected to replace it. Messrs. W. C. Clapp and T. Iredale have kindly written to say that the name Rafinesque proposed was not *Hemitoma*, as Scudder quotes, but *Hemiloma*. Therefore the *Hemitoma* of Swainson, not *Montfortia* of Récluz, must take the place of *Submarginula*. For the group of *H. rugosa*, Mr. Iredale has introduced *Montfortula*.*

H. aspera inhabits the crevices among the compacted tubes of *Galeolaria*,† where it is common near Sydney. When warned, it can cling tenaciously to its foothold. Its movements are deliberate; both head and tail can be protruded beyond the shell. Such parts as are exposed, the back of the head, tentacles, siphonal pipe, and upper surface of hind foot, are black; the rest is buff, which, on the mouth and muzzle, brightens to lemon-yellow. The muzzle is rather long, with broadly expanding lip, notched beneath. The tentacles are long and tapering; they search actively in various directions; at the outer base of each is a short, digitate, ocular tentacle with a large, black eye. On the right side of this, there is, in the male, a curved, cephalic appendage. Along the epipodial line, but interrupted between the tentacles, runs a series of small, short filaments. When the animal leans forward, the ctenidia are exposed; these are worn folded, the edges doubled together on the inside and the stem outside. Beyond the gill-tips, the mantle is slit, its edges coalescing in a short tube external to the shell. The thickened fringe of the mantle-margin is produced into an inner and an outer series of tufts of compound papillæ, the outer ones lying in the crenulations of the shell-rim.

* Iredale, Trans. N.Z. Inst., xlvii., 1915, p.433.

† Hedley, Journ. Roy. Soc. N. S. Wales, xlix., 1915, p.66, Pl.5.

CLANCULUS ALOYSII Tenison-Woods.

Clanculus aloysii Ten.-Woods, Proc. Roy. Soc. Tasm., 1875 (1876), p.155; *Id.*, Hardy, *op. cit.*, 1915, p.62; *Id.*, Pilsbry, Man. Conch., xi., 1889, p.59, Pl. xiv., figs.20-23; *Id.*, Tate & May, these Proceedings, xxvi., 1901, p.400; *Id.*, Pritchard & Gatliff, Proc. Roy. Soc. Vict., xiv., 1902, p.121; *Id.*, Chapman & Gabriel, Proc. Roy. Soc. Vict., xxvi., 1914, p.316.

This Tasmanian species is now found to extend north into New South Wales. I dredged specimens in 7-10 fathoms near Montagu Island. Also unrecorded for the State is *Clanculus plebeius* Philippi, which I have collected in Twofold Bay.

MONODONTA OBTUSA Dillwyn.

(Plate xlvii., fig.12.)

Trochus obtusus Dillwyn, Descrip. Cat., ii., 1817, p.809, for Chemnitz, Conch. Cab., xi., 1795, p.167, Pl.196, figs.1894, 1895. *Monodonta zebra* Menke, Verh. Conch. Malsb., 1829, p.17; *Id.*, Mörch, Malak. Blatt., xviii., 1871, p.125; *Id.*, Maplestone, Month. Micros. Journ., viii., 1872, p.50, Pl. xxvi., fig.2; *Id.*, Troschel, Gebiss Schnecken, ii., 1879, p.232, Pl. xxiii., fig.7; *Id.*, Smith, Zool. Coll. Alert, 1884, p.74; *Id.*, Pilsbry, Man. Conch., xi., 1889, p.91, Pl.20, fig.20; *Id.*, Shirley, Proc. Roy. Soc. Q'land, xxiii., 1911, p.96. *Trochus tenuatus* Quoy & Gaimard, Zool. Astrolabe, iii., 1834, p.249, Pl.63, figs.15-17; *Id.*, Angas, Proc. Zool. Soc., 1867, p.216; *Id.*, Ten.-Woods, Proc. Roy. Soc. Tasm., 1877, p.43; *Id.*, Ten.-Woods, Proc. Roy. Soc. N. S. Wales, 1888, p.119. *Trochocochlea multicarinata* Chenu, Man. Conch., i., 1859, p.360, fig. 2676; *Id.*, Angas, Proc. Zool. Soc., 1867, p.216. *Labio porcatus* A. Adams, Proc. Zool. Soc., 1851 (1853), p.177; *Id.*, A. Adams, Ann. Mag. Nat. Hist. (2), xii., 1853, p.207; *Id.*, Angas, Proc. Zool. Soc., 1867, p.216. *Trochus extenuatus* Fischer, Coq. Viv., 1878, p.330, Pl.103, fig.1.

The above summary of literature shows how superfluous names may accumulate round a well known species. As one of the most common and conspicuous shells on the Sydney beach, this was naturally among the first to be sent to Europe, and described. Yet, for more than a century, the coloured figures given by

Chemnitz remained unrecognised. Lamarck seems not to have distinguished between this and its Tasmanian representative, which he called *Monodonta constricta*. Under his influence, Quoy & Gaimard figured for *constricta* in the zoology of the Astrolabe, both the Sydney "zebra" (Plate 63, figs.23-24), and the Hobart "trochlea" (figs.26, 27). This error had a long existence, for these two were still united in 1902 by Pritchard & Gatliff. But Quoy & Gaimard, in partial recognition of their mistake, submitted *Trochus teniatus* as a name for the Port Jackson species. This name is not to be confused with *Turbo teniatus* Sowerby (Tankerv. Cat., 1825, Append., p.xiii.). Chenu twenty-five years afterwards, added another name, *Trochocochlea multicarinata*. Mörch then pointed out that the names of these Parisian conchologists were anticipated by *Monodonta zebra* of Menke: a name not to be confused with *Trochus zebra* Wood (Index Test., 1828, Suppl., Pl. v., fig.18). For this already overburdened species, Arthur Adams proposed *Labio porcatus*, and Fischer, to avoid clashing with *Trochus porcatus* Philippi, (Zeit f. Malak., 1849, p.187) gave the final name of *Trochus extenuatus*.

Guided by a suggestion in Pilsbry's Monograph, I forwarded a series from this coast, and requested Dr. H. Lynge to compare them with the type of *T. obtusus* still preserved in the Zoological Museum of Copenhagen. That conchologist kindly replied (30/4/16) that the worn and injured shell, which Chemnitz figured in 1795, is absolutely identical with the specimens I sent from Montagu Island.

The species has a great range in colour, development of spiral keels, form and size. Typical *M. obtusa* is a rather depressed form, with 30-40 close, narrow lines; this intergrades with a more abundant, broadly-banded form, *zebra*, with about ten stripes, and with a dwarfed variety from the border of the mangrove-swamps which can be called *porcata*. The species ranges from Moreton Bay to Twofold Bay; its southern limit is not known to me.

Another *Monodonta* occurring in this State is *M. coucamerata* Wood, 1828 (= *Trochus striolatus* Quoy & Gaimard, 1834, = *Labio fuliginea* A. Adams, 1853). I have not myself gathered this

species, but it was found at Clontarf Bay, N.S.W., by Mr. R. Helms, and was dredged by the "Challenger" Expedition. To complete the genus as developed in this State, it is now proposed to insert *Gibbula picturata* Adams & Angas. Neither that nor any other Australian species seems congeneric with *magus*, the type of *Gibbula*.

Those who consider that *Monodonta* Lamarck, 1799, is pre-occupied by *Monodon* Linné, 1758, will employ *Labio* Oken, 1815, as the generic name.

The animal of *M. obtusa* is splendidly arrayed in black and gold. The edge of the muzzle is buff, followed by, first, a band of black and then one of orange, the forehead-flaps are edged with orange, the ocular tentacles are orange below and black above, and the cervical epipodium is orange, the rest of the upper surface being black. The epipodium is differentiated into an anterior, median, and posterior portions. The latter begins just above the tail and continues a little past the operculum; it has a simple expanded margin, from beneath which spring four pairs of lash-tentacles, three of which are beside the operculum, and the fourth is planted where the cervical meets the posterior epipodium. At the base of each lash is set a stump-tentacle, forming an uneven pair like the ocular and cephalic tentacles; the three hinder tentacles are each adnate to their associate stumps, but the anterior lash is parted from its stump, while a stump without a lash stands in the median line behind the operculum. Another lonely stump is the cervical papilla, which occurs on both left and right sides. The medium epipodium or cervical lobe extends from the ocular tentacle to the anterior lash. On the right, it has a plain edge and during locomotion is curled into a makeshift siphon and extruded beyond the lip of the shell. On the left, the edge is cut up into about twenty filaments. The ocular tentacles are compressed from above to below and keeled laterally, thus indicating that they are over-run by the epipodium, which finds its anterior expression in a pair of forehead-flaps on the snout. Even when the animal has withdrawn into the shell, the epipodial lashes steal out from behind the operculum and softly search.

A similar arrangement of the epipodium, entire on the right, slashed in tatters on the left, is shown by *Trochus pica** and *T. lineatus*.†

GENA STRIGOSA A. Adams.

(Plate xlvii., fig.11.)

Gena strigosa A. Adams, Proc. Zool. Soc., 1850, p.37; *Id.*, Sowerby, Thes. Conch., ii., 1854, p.830, Pl.173, figs.11, 12; *Id.*, Angas, Proc. Zool. Soc., 1867, p.218. *Gena nigra* Brazier, Journ. of Conch., vi., 1889, p.72 (not of Quoy & Gaimard).

Mr. T. Iredale was kind enough to compare critically a series of specimens from Sydney with the unlocalised types, three specimens, of *G. strigosa* in the South Kensington Museum. He reports that my set agreed with types in size, shape, and general colouration; and concludes that *Gena strigosa* is the correct name for the Sydney species. He also considers that it does not, as has been indicated, extend to the tropical Indian Ocean.

The favourite haunt of this animal is under rather large boulders in the Hormosira-zone. It crawls rapidly, seeking always to escape from the light. Behind the shell, the large muscular foot extends for more than half the total length of the animal. It is liable to break off by self-mutilation just behind the shell, if the animal is annoyed. It is covered with small, large, and sometimes compound tubercles. The shell is wholly, or partly, overspread by the large mantle, also bearing small and branched processes. Thin, smooth lobes of the mantle protrude on the right and on the left as a scoop or pipe, acting as siphons. Posterior to these are epipodial lobes, three on each side, retracted and exerted from pockets. Beside each lash arises a conspicuous branched process, apparently the homologue of the stump of *Monodonta*. As is usual when the foot is so tubercular, the epipodial line is indistinct. In addition to the three lateral filaments, the epipodium is displayed above the muzzle as a slashed fringe, sometimes separate, sometimes united. Cephalic tentacles long and slender, each with an external ocular stump. Muzzle broad and produced, fringed towards the neck.

* Fischer, Coq. Viv., 1880, Pl. i.

† Randles, Quart. Journ. Micro. Sci., xlviii., 1904, Pl. iv., fig.7.

I suppose that in forming *Plocamotis*, Fischer was misled by a defective sketch of Arthur Adams, and that it is an absolute synonym of *Genia*.

SCUTUS ASTROLABEUS, nom.mut.

Parmophorus australis Quoy & Gaimard, Zool. Astrolabe, iii., 1834, p.321, Pl.69, figs.1-4; *Id.*, Menke, Moll. Nov. Holl., 1834, p.33 (not *P. australis* Lamarck, An. s. vert., vi., (2), 1822, p.5; nor *P. australis* Rüppell, Reis. N. Afrika Moll., 1828, p.37). *Scutus elongatus* Sowerby, Thes. Conch., iii., 1863, p.226, Pl.249, fig.10. *S. anatinus* var. "b" Smith, Journ. of Conch., ii., 1879, p.237.

From King George's Sound, West Australia, the zoologists of the Astrolabe Expedition described a large species of *Scutus*, the shell of which is broader and flatter than the others. The name they used had previously been employed by Lamarck for a compound of the East Australian "antipodes" and the New Zealand "breviculus." This was reduced to the rank of a variety by Smith in 1879, and by Pilsbry in 1890. Now estimated as the Adelaidean representative of the Peronian *antipodes*, and restored to specific rank, it needs this fresh name.

SCUTUS ANTIPODES Montfort.

(Plate xlvii., figs.7, 8, 9.)

Scutus antipodes Montfort, Conch. Syst., ii., 1810, p.59, Pl. xv. *Patella ambigua* Dillwyn, Cat. Recent Shells, ii., 1817, p.1053 (not *P. ambigua* Gmelin, Syst. Nat., xiii., 1791, p.3255). *Scutus anatinus* Smith, Journ. of Conch., ii., 1879, p.258; *Id.*, Tate, Journ. Roy. Soc. N.S.W., xxvii., 1893, p.185; *Id.*, Shirley, Proc. Roy. Soc. Q'land, xxiii., 1911, p.96. *Parmophorus elongatus* Blainville, Bull. Soc. Philom., 1817, p.25, and Malacol., 1827, Pl.48, fig.2; *Id.*, Angas, Proc. Zool. Soc., 1867, p.219; *Id.*, Ten-Woods, Proc. Roy. Soc. Tasm., 1877, p.44 (not *P. elongatus* Lamarck, 1801). *Parmophorus convexus* Quoy & Gaim., Zool. Astrolabe, iii., 1834, p.322, Pl.69, figs.5-16; *Id.*, Forbes, Voy. Rattlesnake, ii., 1852, p.362. *Parmophorus tunidus* A. Adams Proc. Zool. Soc., 1851 (1853), p.222. *Parmophorus australis*

Hogg, Trans. Roy. Micr. Soc., xvi., Pl. xii., fig.57; *Id.*, von Martens, Forsch. Gazelle, iii., 1889, p.263.

As *Patella ambigua* was already occupied by Gmelin in 1791, it is of no consequence whether the *Patella ambigua* of Chemnitz or of Dillwyn meant a species of *Scutus* from New Zealand or another Australian form. But the sketch of Montfort, inartistic though it be, exactly represents that *Scutus* with a narrow shell, inhabiting Tasmania and New South Wales, as distinguished from *S. breviculus* of New Zealand, or *S. astrolabeus* from West Australia. Therefore, *S. antipodes* of Montfort must replace the younger name of *anatinus* now in ordinary use.

The animal of this species lives beneath large stones in rock-pools in clear water. Quoy & Gaimard mention that it was eaten by the aborigines of Jervis Bay. The attitude of an allied species, so frequently copied in textbooks from the Zoology of the Astrolabe, is that of a moribund or preserved individual. An endeavour is here made to offer more life-like figures.

Except the sole of the foot, which is buff, the animal is entirely coal-black. The mantle is very voluminous; two lateral lobes, like those of *Cypræa*, meet over the shell and quite conceal it. Only when handled or sick, do the lobes part and disclose the shell. The mantle also extends on each side behind the shell for a space the breadth of the foot. In front, over the head or each tentacle, an insinuation may temporarily appear. At rest (Fig.8) the animal assumes the shape of an inverted saucer, only the tips of the tentacles protruding beyond the cover of the mantle. The head is elongate, with a long and cylindrical muzzle usually expanded at the distal extremity. The tactile tentacles are long and stout, with a very short ocular tentacle at the outer base of each. From the base of each tentacle, along the epipodial line, runs a series of small, close-set, short lappets. The young differ considerably from the adult. They have a comparatively narrower shell with the apex more excentric; of a white colour, the mantle-lobes, instead of folding across the shell, merely curl over its edge. In a specimen half an inch long (Fig.9), the mantle was deeply notched above the head, and its lobes failed to meet across the shell. It was uniform

buff except the black eyes, which showed through the transparent mantle.

LUCAPINELLA NIGRITA Sowerby.

(Plate xlvii., fig.10.)

Lucapinella nigrita Hedley, Proc. Roy. Soc. Vict., xi., 1894, p.24.

The above sketch was taken from a living specimen at Narooma, N.S.W. The animal has already been described in the reference above cited.

NERITA MELANOTRAGUS Smith.

(Plate xlviii., figs.13, 14.)

The nomenclature of this species has already been discussed in these Studies (*antea*, xxv., p.500).

The animal has narrow black stripes on a buff ground, along the muzzle and upper surface of the foot, the rest being buff. The muzzle is produced into a long and broad lip, fimbriated at the margin. When crawling, which is done with deliberation, the muzzle, expanded to the breadth of the foot, brushes along the ground in front. The ocular tentacle is a flat, triangular lobe grooved on the inner side for the reception of the long, slender, tactile tentacle. It is produced into a spur on the outer base, and is connected by an epipodial fringe with the opercular lobe. The mantle has two lobes, one above the operculum, the other spread below the base of the columella. The margin of it is plain, though in other species it is said to be festooned. In a considerable number of individuals examined, no intromittent organ was observed. The foot is rather small, rounded in front and behind. Sometimes, as in the figure, the gill-plume is protruded from the dorsal cavity till its tip reaches the aperture of the shell. The eggs are separate, white, oblong capsules with a continuous, tough membrane. Frequently, these are deposited on the shells of other individuals of the same species. The operculum (Fig.14) has a smooth, median, falcate area, on each side of which are small, crowded pustules; the convex margin has a membranous edge.

The radula has been illustrated by Maplestone,* from a Williamstown specimen.

PHENACOLEPAS CINNAMOMEA Gould.

(Plate xlviii., figs.17, 18, 19.)

Patella cinnamomea Gould, Proc. Boston Soc. Nat. Hist., ii., 1846, p.151. *Scutellina cinnamomea* Brazier, these Proceedings, iv., 1879(1880), p.389. *Phenacolepas cinnamomea* Thiele, Conch. Cab. Abth. xi.a, 1909, p.35, Pl.6, fig.5. *Scutellina ferruginea* A. Adams, Gen. Rec. Moll., 1854, Pl.52, figs.6, 6a.

This species was described originally as a *Patella*, and was transferred by Adams to *Scutellina*. Remarking that this name of Gray was preoccupied, Pilsbry† substituted *Phenacolepas* for it. I have a grave suspicion that *Plesiothyrens*, Cossmann‡ proposed for a French Tertiary fossil and applied by Sowerby§ to a recent Hong Kong shell, should be employed in its place.

Important remarks by Dr. Dall,|| referring this group to the vicinity of *Nerita*, seem to have been overlooked by subsequent writers.

Dr. Thiele¶ has published some notes on the anatomy of this species.

P. cinnamomea is rather rare; it occurs in Sydney Harbour under large stones in the mud-zone, in communities of a dozen or so under the same rock. The animal is uniform crimson. The shell is carried with the apex turned to the posterior end. A large, open chamber is exposed behind the head, whence the broad, bipectinate ctenidium may be stretched beyond the shell margin or be withdrawn out of sight. The neck is long and flexible; the muzzle terminates in a bilobed upper lip, projecting as an immense hood over and beyond the small mouth. The

* Maplestone, Month. Micros. Journ., viii., 1872, p.14, Pl. xxvi., No.14.

† Pilsbry, The Nautilus, v., 1891, p.89.

‡ Cossmann, Ann. Soc. Malac. Belg., xxiii., 1889, p.191, Pl. vii., figs.13-15.

§ Sowerby, Proc. Malac. Soc., i., 1894, p.191.

|| Dall, Bull. Mus. Comp. Zool., xviii., 1889, p.342.

¶ Thiele, Zeits. wiss. Zool., lxxii., 1902, p.349, Pl. xxvi., figs.133-134, text-fig.11.

tentacles are long and slender, having an ocular bulb at their outer base. From the eye, a crest of muscle runs backward to the shell. In the female (Fig. 19), there is a small lobe and sinus on the right side of this crest. But the male has a large, intromittent organ rooted on the median side of the right tentacle, and carried round below the eye to the back of the neck (Fig. 18). There is no epipodium. Outside the mantle-margin there is a peripheral row of longer and shorter papillæ, corresponding to the radials of the shell; on further magnification, these papillæ are seen to be beaded.

Since writing the above, I have gathered *P. cinnamomea* under stones at the mouth of the Annam River, near Cooktown, Queensland.

The other Australian members of this genus are:—*P. senta* Hedley, 1899, March (= *P. lingua-viverræ* Melvill & Standen, 1899, July); *P. reticulata* Thiele, 1909; *P. mirabilis* Sowerby, 1910; *P. calva* Verco, 1906; *P. alboradiata* Verco, 1906; *P. crenulata* Broderip, 1834; and *P. galathea* Lamk., 1819.

PATELLOIDA NIGROSULCATA Reeve.

Patella nigrosulcata Reeve, Conch. Icon., viii., 1855, Pl. xxx., fig. 84. *Acmea patellarecta* Verco, Trans. Roy. Soc. S.A., xxxvi., 1912, p. 195, Pl. xv., figs. 5-7; Pl. xvi., fig. 5.

At the conclusion of an excellent description of this species, Dr. Verco noted that the West Australian material dealt with, resembled *P. nigrosulcata*, and might eventually prove to be that species. Mr. T. Iredale, under date 13/9/15, writes, "Specimens of Verco's shell have been received at the British Museum, and I compared them, with Mr. Edgar A. Smith's assistance; we agree that the identity is absolute."

CERITHIUM MYSTERIUM, nom. mut.

Cerithium tomlini Hedley, Proc. Linn. Soc. N.S. Wales, xxxix., 1914, p. 717, Pl. lxxxv., fig. 89; not *Cerithium tomlini* Preston, Journ. of Malacology, xii., 1905, p. 3, Pl. i., figs. 11, 11a.

Mr. J. R. le B. Tomlin, to whom this species was dedicated, has reminded me that, in this compliment, I have been antici-

pated by Mr. H. B. Preston. A new name, therefore, becomes necessary, and is here bestowed. I have lately found the species to be plentiful as dead shells on the beach of Lizard Island, North Queensland.

ANCILLA EDITHÆ Pritchard & Gatliff.

Ancilla edithæ Pritchard & Gatliff, Proc. Roy. Soc. Vict., xi., 1899, p.181, Pl.29, fig.5.

This is a new record for this State. On 2nd February, 1916, I dredged several specimens in 7-19 fathoms, off the north end of Montagu Island, on sandy ground.

MARGINELLA MUSTELINA Angas.

(Plate 1., fig.31.)

Marginella fasciata Sowerby, Thes. Conch., i., 1846, p.389, Pl.76, fig.142; *Id.*, Chenu, Man. i., 1859, p.197, fig.1041; *Id.*, Tomlin, The Nautilus, xxix., 1916, p.138 (not *Persicula fasciata* Schumacher, Essai nouv., 1817, p.235). *Hyalina mustelina* Angas, Proc. Zool. Soc., 1871, p.90, Pl. i., fig.5; *Id.*, Oliver, Trans N. Z. Inst., xlvii., 1915, p.537. *Volvarina rubrifusciata* Jousseau, Rev. et Mag. Zool., (3), iii., 1875, p.221.

This species lives under rocks on the ocean-beach. The animal is very active, coloured orange variegated with buff. There is no operculum. A papillate mantle closes over the shell. Foot in front notched, sometimes produced into lobes, behind pointed and projecting past the shell. Tentacles wide-spread, rather short and blunt, eyes sessile at the outer bases of the tentacles. Rostrum exerted more than half the length of the tentacles. The specimens drawn were obtained at Narooma, N.S. W., whence I have traced it north to Mast Head Island.

CONUS CORONATUS Gmelin.

Conus coronatus Gmelin, Syst. Nat., xiii, 1791, p.3389; *Id.*, Dillwyn., Descrip. Cat, i., 1817, p.403; *Id.*, Hedley, these Proceedings, xxxii., 1907, p.484. *Conus minimus* Hwass, Encycl. Méth., vers (2), 1792, p.618; *Id.*, Reeve, Conch. Icon., i., 1843, Pl. xxvi., fig. 143; *Id.*, Sowerby, Thes. Conch., iii., 1853, p.9, Pl. 189, figs-54, 55, Pl.191, figs.99, 111; *Id.*, Angas, Proc. Zool. Soc.,

1877, p.184; *Id.*, Brazier, Journ. of Conch., ii., 1879, p.190; *Id.*, Smith, Proc. Zool. Soc., 1891, p.402; *Id.*, Melvill & Standen, Journ. Linn. Soc. Zool., xxvii., 1899, p.156 (not *Conus minimus* Linné, Syst. Nat., x., 1758, p.714—sole citation, Argenville t.15, f.A = *Conus figulinus* Linné, —*vide* Hanley, Linn. Ips. Conch., 1855, p.169). *Conus tæniatus* Hwass, *op. cit.*, p.628, Pl.319, fig.5. *Conus miliaris* Hwass, *op. cit.*, p.629, Pl.319, fig.6. *Conus barbadensis* Hwass, *op. cit.*, p.632, Pl.322, fig.8 (not *C. barbadensis* of Reeve or of Sowerby, *vide* Kiener). *Conus bandatus* Perry, Conchology, 1811, Pl. xxv., fig.4. *Conus tiaratus* Broderip, Proc. Zool. Soc., 1833, p.52. *Conus abbreviatus* Reeve, Conch. Icon., i., 1843, Pl. xvi., fig.86. *Conus aristophanes* Sowerby Thes. Conch., iii., 1853, p.9, Pl.190, figs.81, 82.

Hanley pointed out that the original *Conus minimus* was clearly based on that shell which modern authors know as *C. figulinus*. From the figures of Valentyn and Gualtier, a shell hitherto unnamed was correctly introduced by Gmelin as *Conus coronatus*. He also included other species, such as *C. nobilis* Linné. This synonymy was purified by Dillwyn. Appreciating the error of Hwass, Smith referred to the species, in 1891, as *C. minimus* Auctorum. The natural inference that *minimus* meant "least," whereas it was a latinised form of "La Minime," meaning the monkish, perhaps countenanced the error of Hwass, mostly adopted by modern authors. It follows that *C. figulinus*, reported from Torres Strait by Melvill & Standen (and recently taken by myself at Lucinda Point, Queensland) must now assume the name of *minimus*.

This tropical species descends into New South Wales. It was recorded from the Bellenger and Redbank Rivers by Angus and Brazier, and was recently taken at Woolgoolga by Mr. C. Lason. Melvill, Standen, and Shirley have reported it from Murray Island, Smith from Port Essington, Brazier from Fitzroy Island, and the writer from Mast Head Island. It is one of the commonest and most widely dispersed shells in the tropical Pacific. It grows to a length of 45 mm., and may combine the broken, dark spirals of *aristophanes* with the dot-pattern of *miliaris*, with the smooth crown of *tæniatus* or the tubercular

summit of the type. The ground-colour may be in bands or clouds, the articulated dark and white spirals may be developed as broken lines or reduced to dots.

MITRA RHODIA Reeve.

(Plate xlvi., figs.15, 16.)

Notes on the nomenclature of this species have already appeared in these Studies (*antea*, Vol. xxxviii., p.313). It inhabits the sand and broken shells that litter the floor of the rock-pools. The long proboscis is probably used for sounding in the sand for its prey. Its movements are slow. There is no operculum. The colour of the animal is uniform cream, against which the small, black eyes are conspicuous. Foot long and narrow, pointed behind, squarely truncate in front. Head rhomboidal, broader anteriorly; tentacles rather short, apparently only partly contractile, widely spaced. When the proboscis is completely retracted, as in the specimen drawn, the head has somewhat the aspect from above of a cow's head and horns. The siphon is rather long. In the radula, the rachidian has four cusps, the outer smaller and divergent. The lateral has a long, oblong base slightly sinuate posteriorly, with about fifteen cusps, the inner directed towards the rachidian, the second and third largest, the rest gradually diminishing to minute exterior denticles.

MACULOTRITON AUSTRALIS Pease.

(Plate l., figs.28, 29, 30.)

The local members of this genus were discussed *antea*, Vol xxxix, p.733. *M. australis* haunts the shaded sides of boulders at low-water level on the ocean-beach. The animals creep about with moderate activity; they are marbled with black and buff. The head is narrow, forking into divergent tentacles which support eyes at half their length, above which point the tentacles contract to half their former thickness. Siphon rather short, only protruded for a length equal to three or four diameters. Foot long and slender. Operculum (Fig.29) with the nucleus apical, situated about its own length from the tip of the tail.

The radula (Fig.30) has a rachidian with arched base, three median pointed cusps and a small external one; laterals bicuspid, the inner cusp half the size of its fellow, with two small denticles on its inner blade, the outer cusp slender and falcate.

ARCULARIA PARTICEPS Hedley.

(Plate xlix., fig.20.)

This species was named, *antea*, Vol. xxxix., p.738. The animal lives sunk beneath the surface of the sand. Into a pool where no *Arcularia* were visible, a few crushed shellfish were thrown; a few minutes afterwards a number of individuals, including the subject of my sketch, appeared in various directions, all steadily crawling towards the bait. The animal of *A. particeps* is particularly bold and active. When lifted out of the water by the shell, the animal twists and kicks about with much vigour. The colour of it is cream irregularly splashed with black.

XYMENE HANLEYI Angas.

(Plate xlix., figs.21, 22, 23, 24.)

Trophon hanleyi Angas, Proc. Zool. Soc., 1867, p.110, Pl. xiii., fig.1.

In previous papers, I have figured the young shell of this, under the title of *Trophon paiva* (*antea*, Vol. xxxiii., p.456), and later noted that Tryon made a mistake in subordinating *T. hanleyi* to *T. paiva* (*antea*, Vol. xxxviii., p.329). For this group, Hutton introduced the genus *Kalydon*, but Iredale, on the ground that *Kalydon* was preoccupied, has substituted *Xymene*.*

The animal (Fig.21) is very common under stones in the mud-zone in Sydney Harbour, where it is notorious as an oyster-pest. † The eggs (Figs.23, 24) are laid in separate packets, each packet round, about 5 mm. in diameter, rather flatter than hemispherical, with a central circular orifice about 1.5 mm. across. The ova are visible both through the orifice and through the semitransparent membrane. These eggs are deposited on the under surface of shells and stones. So crowded are they, that Mr. T.

* Iredale, Trans. N.Z. Inst., xlvii, 1915, p.471.

† Saville Kent, Parliamentary Report on Oysters and Oyster-Fisheries of Queensland, 1891, p.10, Pl. i., figs.1, 10, 11.

Dick, who kindly furnished me with the material drawn, writes, under date 13th July, 1915, that, in an infested area in Port Macquarie, the stones were then almost white with the ova of this borer.

PLANISPIRA STRANGULATA Hombron & Jacquinot.

Helix strangulata Hombron & Jacquinot, Ann. Sci. Nat., (2), xvi., 1841, p.64. *Planispira cyclostomata* Hedley, Rec. Austr. Mus., viii., 1912, p.155, Pl. xlv., figs.51-54.

A preliminary paper by Hombron & Jacquinot, describing the new shells obtained by the Astrolabe and Zélée Expedition, was lately discovered by that active bibliophile, Mr. Tom Iredale. In the official account of that expedition by Rousseau, and in unofficial work by Le Guillou, a member of it, this memoir is ignored. It has also been overlooked by Pfeiffer, Reeve, Tryon, von Martens, Smith, and every writer on the subject.

Examining the nomenclature of this species, in 1912, I concluded that the name to be adopted for this shell from Warrior Island was *Helix cyclostomata*, published by Le Guillou in 1842. It now appears that the name of *strangulata* was published a year earlier, instead of many years later, than *cyclostomata*.

Another consequence of the establishment of *H. strangulata* as dating from 1841, is that *H. strangulata*, proposed by C. B. Adams in 1849, becomes invalid.

PLANISPIRA TORRESIANA Hombron & Jacquinot.

Helix torresiana Hombron & Jacquinot, Ann. Sci. Nat., (2), xvi., 1841, p.63. *Helix delessertiana* Le Guillou, Rev. Zool., v., 1842, p.138; *Id.*, Pilsbry, Man. Conch., 2nd ser., ix., 1894, p.114.

Here it again becomes necessary to restore the older but forgotten name. In his independent publication of the new species obtained by the expedition, Dr. Le Guillou seems to have been either careless or disloyal.

XANTHOMELON DURVILLII Hombron & Jacquinot.

Helix Durvillii Hombron & Jacquinot, Ann. Sci. Nat., (2), xvi., 1841, p.62. *Helix pomum* Pfeiffer, Symbolæ hist. Heli-

ceorum, ii., 1842, p.37.; *Id.*, Pilsbry, *Man. Conch.*, 2nd ser., vi., 1890, p.178, Pl.38, figs.73, 74.

Here again, the name first proposed by the circumnavigators precedes that in current use. It is a pleasure to reinstate in Australian zoological nomenclature the name of this unfortunate and gallant explorer.

MARSENIOPSIS WILSONI Smith.

Lamellaria wilsoni Smith, *Ann. Mag. Nat. Hist.*, (5), xviii, 1886, p.270, text-fig.; *Id.*, Wilson, *Vict. Nat.*, iv., 1887, p.117; *Id.*, Pritchard & Gatliff, *Proc. Roy. Soc. Vict.*, xii., 1900, p.196. *Marseniopsis wilsoni* Vayssière, *Exped. Antarct. Franc.* Charcot, 1907, *Moll.*, p.35.

Typically southern is the genus *Marseniopsis*, first introduced by Bergh for two subantarctic species taken by the Challenger Expedition, *M. pacifica*, from Kerguelen, and *M. murrayi*, from Marion Island. A pair of Antarctic forms, *M. conica* and *M. mollis*, were discovered near Cape Adare, Adélie Land, while a fifth, *M. antarctica*, was dredged by Dr. Charcot off Wandel Island.

Discussing the distribution of the group in relation to the latter species, Prof. Vayssière points out that the Australian *Lamellaria wilsoni* should be here included. In the British Museum, there is a single specimen of *L. wilsoni*, presented by Mr. J. B. Wilson, and marked "type."

I now suggest that a second Australian member is *Caledoniella contusifomis* Basedow.*

PHYTIA ORNATA Férussac.

(Plate I., figs.26, 27.)

The nomenclature of this species was discussed (*antea*, xxxviii., p.334) under the heading of *Ophicardelus ornatus*.

Its habits are to associate with *Rhodostoma*, *Salinator*, and *Assemania* in the Salicornia-zone, that is, just below high-water level in sheltered estuarine swamps, either in the open or under the shade of the Avicennia-mangrove. At low tide, the *Phytia*

* Basedow, *Trans. Roy. Soc. S.A.*, xxix., 1905, p.183, Pls. xxvii., xxix.

crawls over the mud at a fair pace; if placed in a vessel of sea-water, it soon creeps out, and always moves steadily away from the light.

The foot is small and narrow for the size of the shell; there is no operculum. The facial area is darker in colour, and covered with finer tubercles than the rest of the animal; it is marked off from the foot by a groove on each side. When the animal is extended, the tentacles are planted well apart, but seem to spring from contiguous bases when it is contracted. They are sub-cylindrical, slightly tapering, blunt at the tips, contractile, not evaginate. The eyes are sunk within the substance of the tentacle. Near the tip of the muzzle are two, white, oblong marks that may represent the smaller tentacles of the *Helicidæ*.

The muzzle is unusually broad, being as wide as the foot. Sometimes it is emarginate in front, and usually recurved at the margins. The mouth is in the centre of a large, labial disc. Between this disc and the fore-part of the foot is a shallow pouch.

SIPHONARIA SCABRA Reeve.

(Plate 1., fig.32.)

Siphonaria scabra Reeve, Conch. Icon., ix., 1856, Pl. i., fig.2.

This species occurs on sheltered rocks at low water. It does not cling as firmly to the rock as a limpet does, and, when upset on its back, finds more difficulty in turning over. On the right is a free lobe of the mantle, sometimes rolled in a funnel or spread in a flap, and reaching to the edge of the shell. The head is devoid of any trace of tentacles; the eyes are small, and sunk under the surface. The muzzle is spotted with black; it projects a little past the foot, and terminates in a broad, mobile, upper lip, which may assume a notch in front and recurved corners at the side. Beneath it is the mouth. The foot is spotted on the side and is of the ordinary limpet-shape.

RHIZORUS.

Rhizorus Montfort, Conch. Syst., ii., 1810, p.339, Pl. lxxxv., for *R. adalaidis* Montfort, = *Bulla acuminata* Bruguière, 1792. *Volvula* A. Adams, in Sowerby, Thes. Conch., ii, 1850, pp.558,

596, for *B. acuminata*, etc. *Volvulella* Newton, Syst. List. Brit. Oligocene, Eocene Moll., 1891, pp. xii., 268, for *Volvula* Adams, not Oken, 1815.

Some discussion has occurred over the validity of the name *Volvula*. On the ground that *Volvulus* Oken, 1815, preoccupied *Volvula* Adams, 1850, Mr. R. Bullen Newton replaced it, in 1891, with a new name, *Volvulella*. But, as Dr. H. A. Pilsbry considered that it was not thus invalidated, he employed *Volvula* in his monograph of the genus in the Manual of Conchology, in 1893.

Neither of these authorities seems to have seriously considered the claim of *Rhizorus*. As early as 1810, *Rhizorus adalaidis* was legitimately proposed by Montfort, for a shell the size of a grain of millet, found on a sandy beach at Porto Ferrajo, in the island of Elba, Italy. From a rough, reversed, but recognisable woodcut, it seems clear that *R. adalaidis* is *Bulla acuminata* Bruguière, 1792,* because that is the only Mediterranean shell which corresponds in size and contour. This is itself the type, both of *Volvula* and of *Volvulella*, so, as was indicated sixty years ago by Menke,† *Rhizorus* must be given precedence. The Australian species concerned in this change of nomenclature are *Volvula rostrata* A. Adams, *V. sulcata* Watson, and *V. trayula* Hedley.

ODOSTOMIA PASCOEI Angas.

(Plate xlv., fig.5.)

Odostomia pascoei Angas, Proc Zool. Soc., 1867, p.112, Pl. xii., fig.12.

In the Natural History Museum at South Kensington, I examined a single specimen, marked as the type of *O. pascoei*, and seven specimens marked as types of *O. krefftii* Angas. These two agree in all particulars, except that *O. pascoei* has an additional whorl, and a corresponding increase in length and breadth. Since it is the adult which *O. pascoei* represents, and since that

* Jeffreys, Brit. Conch., iv., 1867, p.412.

† Menke, Malak. Blatt., i., 1854, p.46.

name also happens to have page-precedence, it is recommended that *O. krefftii* be reduced to synonymy.

The species haunts crevices on the under surface of loose rocks between tide-marks. When kept in an aquarium, it endeavours to creep from the light to the darkest corner available. The colour is uniform cream, the foot truncate or emarginate. The rhinophores are folded, narrow, pointed and divaricate; beneath and between these are two falcate processes. The eyes are black, close together in the median line, just behind the junction of the rhinophores. The external appearance suggests that a natural classification would group the family Pyramidellidæ in Opisthobranchiata near the Actæonidæ.

DOLABRIFERA BRAZIERI Sowerby.

(Plate xlix., fig.25.)

Dolabrifera brazieri Sowerby, Proc. Zool. Soc., 1870, p.250; *Id.*, Angas, *op. cit.*, 1871, p.98. *Dolabrifera jacksoniensis* Pilsbry, Man of Conch., 1896, p.120, Pl.44, figs.38, 39, 40, 41.

The haunt of this species is the coralline zone of the ocean-rocks, where form and colour tend to conceal it against its native background. In extension, the animal is about four inches long, and one and a half broad. The colour is olive-brown, variegated with buff, and tinged, at the margin and on the tentacles and rhinophores, with green. Upon the back are about a score of warty protuberances, which rise or subside at the will of the animal, and from the summit of which a white filament may project for two or three millimeters, or be withdrawn.

The tentacles are comparatively short and broad, bell-shaped, split nearly to the base, with ragged margin. The rhinophores are narrow, more cylindrical, less deeply notched, set farther back on the neck. Just in front of these are the sessile, inconspicuous, black eyes.

The posterior orifice is set far back, is ovate, about 6 mm. long, with erect margins and an inner lobe rising at the anterior end. In front of this, the right side of the mantle overlaps the left. The gill is never exerted.

Only one species of this genus is known locally. Mr. Brazier, who collected the type-specimens, agrees with me that *D. jacksoniensis* probably represents the young of the unfigured *D. brazieri*. The specimen drawn, I gathered at Long Reef. I have also seen the species at Maroubra.

EXPLANATION OF PLATES XLVI.-LII.

Plate xlvi.

- Fig. 1.—*Solecardia cryptozoica* Hedley; animal expanded.
 Fig. 2.—*Marcia nitida* Quoy & Gaimard.
 Fig. 3.—Orifice of inhalant siphon of same.
 Fig. 4.—*Amphidesma angusta* Reeve.
 Fig. 5.—*Odostomia pascoei* Angas.
 Fig. 6.—*Hemitoma aspera* Gould.

Plate xlvii.

- Fig. 7.—*Scutus antipodes* Montfort, crawling.
 Fig. 8.—The same at rest.
 Fig. 9.—Young stage of same.
 Fig. 10.—*Lucapinella nigrita* Sowerby.
 Fig. 11.—*Gena strigosa* A. Adams.
 Fig. 12.—*Monodonta obtusa* Dillwyn.

Plate xlviii.

- Fig. 13.—*Nerita melanotragus* Smith.
 Fig. 14.—Operculum of same.
 Fig. 15.—*Mitra rhodia* Reeve.
 Fig. 16.—Radula of same.
 Fig. 17.—*Phenacolepas cinnamomea* Gould.
 Fig. 18.—Intromittent organ of same individual.
 Fig. 19.—Head of female *P. cinnamomea*, the lip expanded above the pedal mucous gland.

Plate xlix.

- Fig. 20.—*Arcularia particeps* Hedley.
 Fig. 21.—*Xymene hanleyi* Angas.
 Fig. 22.—Operculum of young *X. hanleyi*, the muscle-scars visible through its substance.
 Fig. 23.—Cluster of ova of *X. hanleyi*.
 Fig. 24.—A single egg-capsule further enlarged.
 Fig. 25.—*Dolabrifera brazieri* Sowerby, also detail sketch of tubercle and exserted filament.

Plate I.

- Fig. 26.—*Phytia ornata* Férussac.
Fig. 27.—The same from below.
Fig. 28.—*Maculotriron australis* Pease.
Fig. 29.—Operculum of same.
Fig. 30.—Radula of same.
Fig. 31.—*Marginella mustelinu* Angas.
Fig. 32.—*Siphonaria scabra* Reeve.

Plate li.

- Figs. 33, 34, 35.—*Arca botunica* Hedley.
Figs. 36, 37.—*Arca metella* Hedley.
Figs. 38, 39.—*Lucinda hilaira* Hedley.
Fig. 40.—*Solecardia cryptozoica* Hedley.

Plate lii.

- Fig. 41.—*Cardium cymorum* Deshayes.
Figs. 42, 43.—*Tellina astula* Hedley.
Fig. 44.—*Tugalia intermedia* Reeve.
Fig. 45.—*Tugalia parmophoidea* Quoy & Gaimard.
Fig. 46.—*Tugalia cicatricosa* A. Adams.
Fig. 47.—*Tugalia bascanda* Hedley.